

**Project Title:** Colorado Associated Community Health Information Exchange (CACHIE)  
**Principal Investigator:** Davidson, Arthur, M.D.  
**Organization:** Denver Health and Hospital Authority  
**Mechanism:** RFA: HS07-002: Ambulatory Safety and Quality Program: Enabling Quality Measurement through Health IT (EQM)  
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**Project Period:** 01/08 – 09/09  
**AHRQ Funding Amount:** \$986,302  
**Summary Status as of:** December 2008

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**Strategic Goal:** Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

**Business Goal:** Implementation and Use

**Summary:** This project was initiated in January 2008 and has completed the first half of the grant period. This project is designing, developing, implementing, and evaluating an interoperable quality information system (QIS) for a collaborative network of seven community health centers (CHC) that permits real-time and synchronous quality reporting to inform patient care, quality interventions, and health policy and advocacy efforts. The QIS is foundational in nature, ultimately supporting many types of quality and safety analyses. The QIS will aggregate data elements from disparate electronic health records (EHRs) using a data warehouse and business intelligence programming to generate meaningful quality measures and reports at the patient, physician, practice, and population level. The initial chronic disease focus is diabetes mellitus, and the second condition currently planned is tobacco cessation.

The initial proposal included the implementation of Guideline Information System (GIS) to garner consensus regarding disease/condition management guidelines and the implementation of guideline-concordant templates into disparate EHRs. The GIS was to include a modular template design allowing efficient updating, reuse, and blending of templates for patient encounters that require concurrent use of multiple disease guidelines. The GIS was to assist with: 1) the provision and documentation of evidence-based care, and 2) the export and standardization of data elements to allow both quality reporting and ultimate real-time clinical decision support. Over the course of the project, the focus has shifted, based on the needs of the stakeholders. The current primary focus with clinician stakeholders is to develop consensus on the quality measures required for diabetes reporting and on the ancillary information that allows the report to be actionable for quality improvement. Some physician leaders had concerns and negative attitudes regarding the need for templates in clinical care, while other CHCs were working on template development independent of this project. It was decided that the baseline reporting and benchmarking available via the QIS would assist in identifying and supporting the need for future templates. Clinical reporting both inspires and allows providers and practices to “question the data,” hence uncovering areas whether appropriate care was either not provided or it was provided, but not documented in a manner amenable to data extraction. Efficient guideline-concordant templates should address both of these problems, given they are readily used.

A second focus for this effort is to establish a replicable process for quality report measure and actionable report development in other clinical domains, as diabetes is used as the prototype. This involves the clinicians as well as technical support staff involved in the goal of creating a standard and efficient process for building consensus, documenting functional requirements, data mapping, and then

implementing. This is essential if Colorado Associated Community Health Information Exchange (CACHIE) is to extend beyond diabetes measures.

The QIS system is standardizing data using emerging national standard vocabularies and will report quality measures in a timely, efficient, and user-convenient manner. The QIS supports: 1) identification of best practices; 2) establishment of appropriate CHC benchmarks; 3) development, implementation, and evaluation of targeted quality improvement interventions; 4) use of clinical decision support systems; and 5) promotion of public policies to improve health and health services to low income populations. The Certification Commission for Healthcare Information Technology (CCHIT) certified EHRs used in this project include NextGen 5.4.28 and GE Centricity as the pilot EHRs. Other future EHRs involved in the project include EHS 5.0j.113 and Noteworthy 5.4.2. None of the EHR vendors working with this project were ready to start exchanging continuity of care documents (CCDs), nor could they be assured that all of the information of interest would be included in the exchange. NextGen and GE technical departments are committed to incorporating CCD formats when CCD standards are finalized and become the standards for interoperability.

### Specific Aims

- Obtain detailed business and technical requirements for development of: 1) a flexible, evidence-based, clinical template system that interoperates with four vendor-based EHRs, and 2) a timely and efficient quality information reporting system that aggregates and integrates multiple data sources within seven CHCs. **(Ongoing)**
- Develop a system for garnering consensus among various CHCs on DM quality measures and actionable report measures. **(Ongoing)**
- Extract data from two disparate EHRs, standardize to nationally recognized vocabularies, and import into a shared data warehouse. **(Ongoing)**
- Implement and deploy a business intelligence tool for self-service and static reporting. **(Ongoing)**
- Guide, support, and evaluate each CHC practice to build capacity and monitor associated costs as they independently (e.g., without vendor support) implement an evidence-based guideline template. **(Upcoming)**
- Evaluate the usability, utility, accuracy and best methods for incorporating quality measure reporting as a feedback mechanism to providers and practice managers. **(Upcoming)**

**2008 Activities:** The project prepared materials such as guidelines, quality measures, and flow diagrams for the business process analysis (BPA). The first round of BPA focus groups and site visits were conducted with the CHCs to inform user and business requirements for the GIS and QIS. User requirements were developed and disseminated and used to create the Request for Information (RFI) and Request for Proposal (RFP) distributed in the vendor selection process. Activities to support the design and implementation of evidence-based templates were put on hold because the CHCs had already and/or were in the process of implementing templates of their own. The project established a Clinical Advisory Work Group to finalize the diabetes outcome measures for reporting. The project also elected to create a CHC stakeholder committee to address and develop policies and procedures for appropriate use and governance for the shared QIS.

An RFI to support the QIS was disseminated to over 30 vendors. A key factor explored through the vendor selection process was the capacity for the vendors to use standard messaging such as health level seven (HL7) and CCD for interfacing and connectivity. The report prepared by one of the project consultants found that most EMR vendors are not ready to implement CCD exchange for bidirectional communication. Subsequently, a formal RFP was distributed in November 2008 to four vendors regarding extraction, transformation, loading, data warehousing, and business intelligence for CACHIE.

**Preliminary Impact and Findings:** Publicly available findings will be disseminated closer to the end of the project.

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### **Selected Outputs**

A one-page Use Case and Workflow illustrating the visit and post-visit constructs of the QIS.

AHRQ 2008 Annual Conference presentation: Creating a Shared Quality Improvement Reporting System ([PowerPoint® File](#), 1.7 MB; [Web Version](#)).

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**Grantee's Most Recent Self-Reported Quarterly Status:** The project is meeting 30 to 65 percent of its milestones. The project did not focus on template design and implementation because the CHCs had already completed work in this area prior to this project. To overcome the delays, the project will leverage a pre-existing effort within the CHCs to implement a tobacco cessation template as the project's second disease/condition topic. It is expected that with these changes and the selection of QIS vendors, completion of the project will be achieved. The project is somewhat under spent by 5 to 20 percent due to the decision to stop activities related to template design. Full use of the budget is expected as the project moves forward with extraction, transformation and loading activities, building a data warehouse, and business intelligence tools. The extensive early planning activities have resulted in a more comprehensive list of functional requirements and documentation of specific quality information system reporting needs. By building consensus, the prototype or pilot development was limited so that the first iterations will likely be completed over the next 6 months with greater specificity of outputs and outcomes based on extensive early business analysis.

**Milestones:** Progress in meeting many milestones is stalled.

**Budget:** Somewhat under spent, approximately 5 to 20 percent.